



DESIGN OF AN INTELLIGENT FRIDGE TO QUANTIZE FOOD ROTTING

Eren Karadağ, Sami Enes Yılmaz

Supervisor: Dr. Seniha Esen Yüksel

Hacettepe University, Electrical and Electronics Engineering

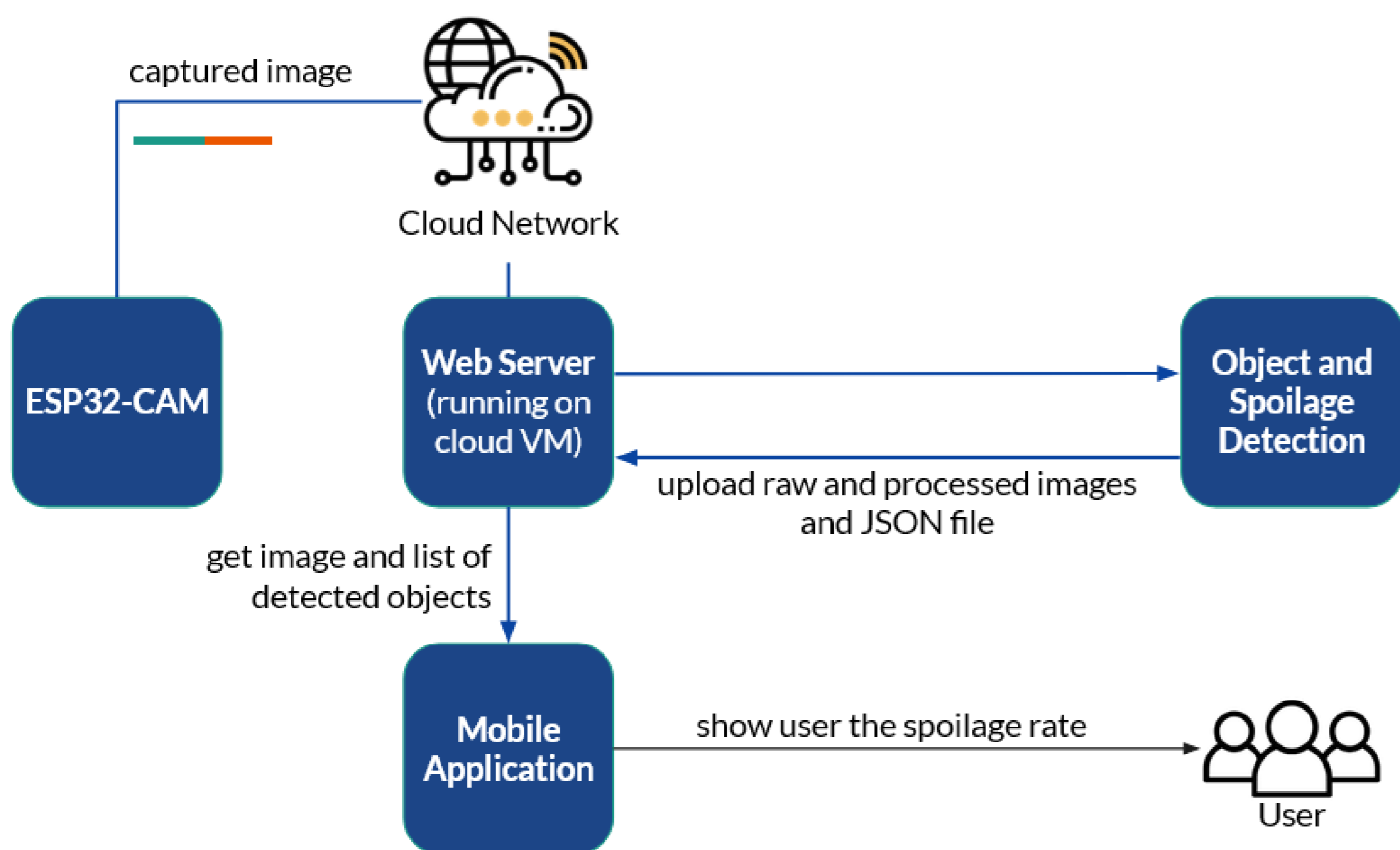


INTRODUCTION

Food waste is a serious global issue with widespread economic and ecological consequences. The excessive amount of discarded food not only leads to significant economic losses but also contributes to environmental pollution.

The aim of this project is to design a system that informs individuals to effectively manage their consumption habits based on the expected shelf life of food with the aid of artificial intelligence.

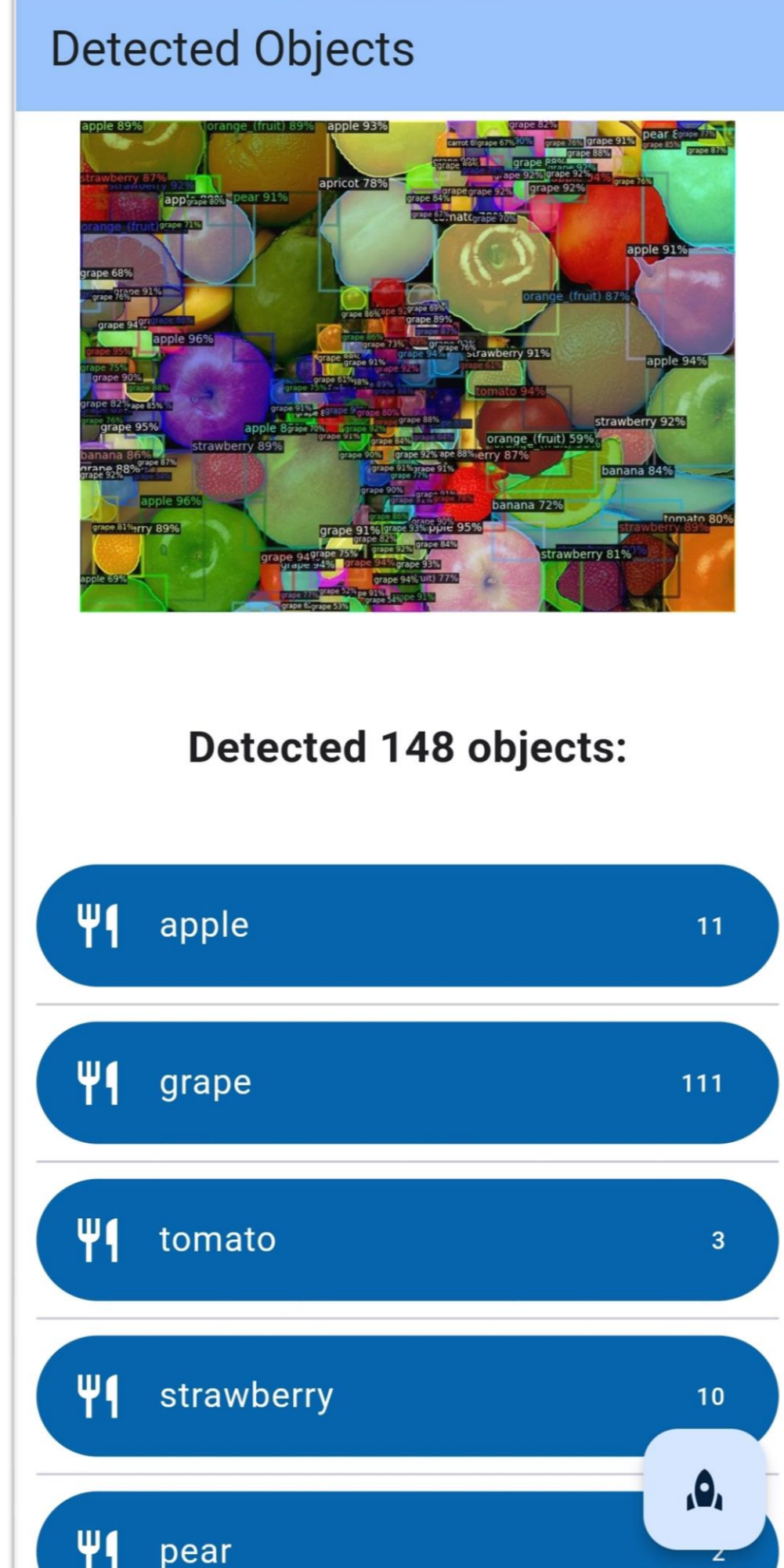
METHODOLOGY



Recent advancements in artificial intelligence and computer vision enable object detection and segmentation models to swiftly identify a variety of objects.

These artificial intelligence models can be run on cloud computing machines without the need of any external hardware.

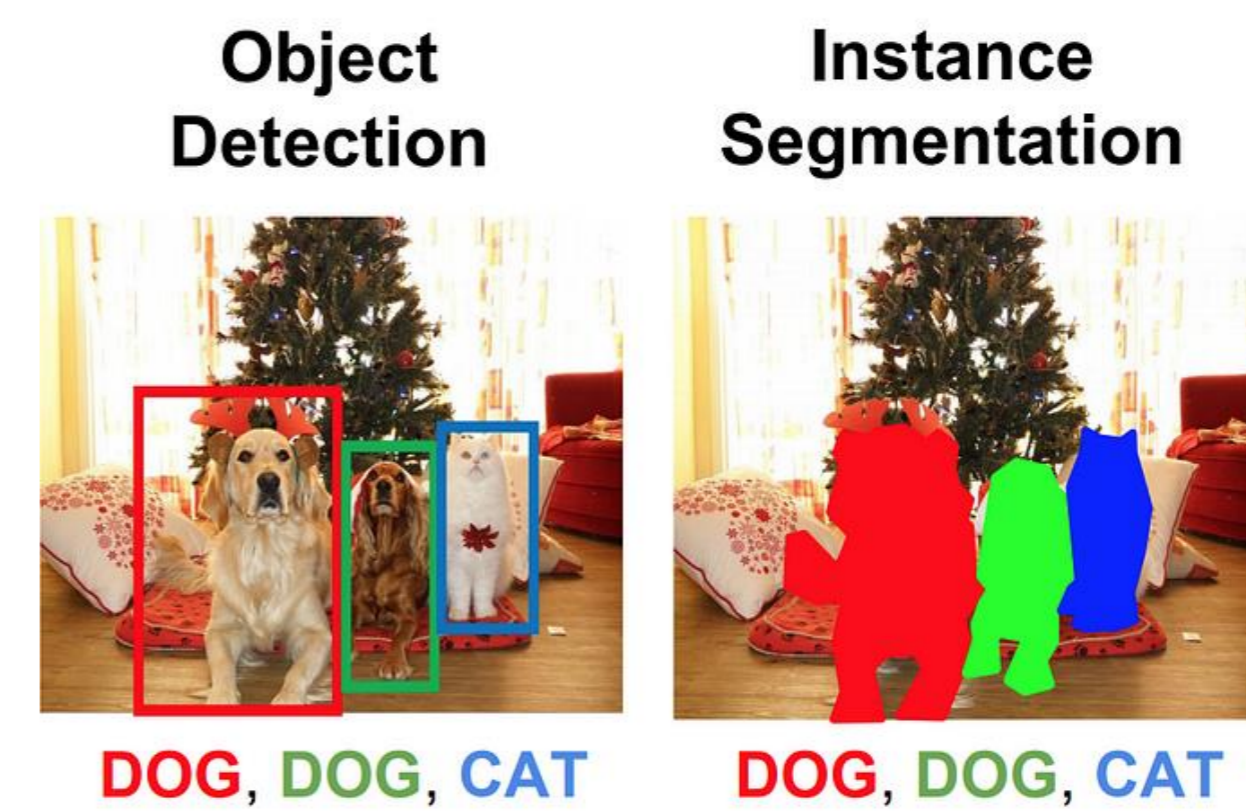
By integrating object detection, segmentation models, and cloud computing, an informative system can be designed to alert individuals about the safety and number of their food.



Processed image with the machine learning algorithm

PROJECT DESIGN

In this project, two mobile applications have been developed using Flutter to detect and segment various objects, such as fruits and vegetables. One of the apps primarily serves as an inventory control tool by listing both the total and unique number of objects. The second app is designed to calculate the spoilage rate.



ESP32-CAM development board captures images at regular intervals and conserves its resources by entering sleep mode when not in use. ESP32-CAM triggers PHP scripts to save images in an Apache web server running on a Linux cloud virtual machine. These saved images follow a series of processing steps. Initially, object detection and segmentation are performed on the images using Meta AI's Detic model. Then, The detected objects and their quantities are saved as a list in a JSON file. Finally, the processed image and the list of objects stored in the server are shown on the mobile application.



Detected 1 object:

ψ Peach

30.28%

The spoilage rate can be determined by the other mobile application. This spoilage rate is calculated by a segmentation model which is solely trained on peach images and masks. The aforementioned applications may potentially be merged into a single app after the machine learning model is trained on a broader range of fruits and vegetables.

ACKNOWLEDGEMENTS

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